



# Species

Birds got wings from small, meat-eating theropod dinosaurs (Maniraptorans) around 150 million years ago

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The clade Maniraptora is the group of theropod dinosaurs that many paleontologists believe birds were derived from some 150 or so million years ago, in the Jurassic period. Hence, according to phylogenetic taxonomy, birds are by definition maniraptorans, and the other maniraptorans are their closest relatives. Maniraptora is a diverse and interesting group, with many specimens that outwardly look dissimilar, but have enough structures in common (*synapomorphies*) to unite them as a group. Maniraptorans are united by the possession of modified elements in the wrist; the *semilunate carpal* is a bone unique to this group — along with other modifications of the forelimb, it makes the *flight stroke* in birds possible, and was probably *co-opted* by birds for flight from a grasping function. Other characteristics present in typical maniraptorans include a fused clavicle (furcula, or "collar bone") and sternum ("breast bone"), a pubis (part of the pelvis) that points downwards rather than forwards as in typical saurischians, a shortened and distally stiffened tail, long arms, and a manus (hand) which is larger than the pes (foot). Maniraptorans are characterized by long arms and three-fingered hands as well as a "half-moon shaped" (semi-lunate) bone in the wrist (carpus). Maniraptorans are the only dinosaurs known to have breast bones. Dececchi, a postdoctoral researcher at the University of South Dakota said the origin of birds and powered flight is a classic major evolutionary transition. His findings suggest that the limb lengths of birds had to be dissociated from general body size before they could radiate so successfully. It may be that this fact is what allowed them to become more than just another lineage of maniraptorans and led them to expand to the wide range of limb shapes and sizes present in today's birds.

## REFERENCE

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2. McGill University (2013, September 17). How birds got their wings: Fossil data show scaling of limbs altered as birds originated from dinosaurs. *ScienceDaily*. Retrieved September 19, 2013, from <http://www.sciencedaily.com/releases/2013/09/130917123613.htm>